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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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27572	7590	04/27/2004	EXAMINER	
HARNESSE, DICKEY & PIERCE, P.L.C.			KERN, KEVIN P	
P.O. BOX 828			ART UNIT	
BLOOMFIELD HILLS, MI 48303			PAPER NUMBER	
			1725	

DATE MAILED: 04/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

AS

Office Action Summary	Application No.	Applicant(s)	
	09/916,000	WILLIAMSON, WARREN G.	
	Examiner	Art Unit	
	Kevin P. Kerns	1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Meloche (US 1,502,861).

Meloche discloses a vertically parted sand mold assembly having first and second side patterns that define first and second impressions, respectively, such that the assembly includes a sand core C defining a pouring basin cavity communicating with a sprue D, with the core C having an imprint surface and containing a hole to function as a gate (region around E,F) and to couple the pouring basin cavity to a separate casting cavity (G,H) formed by the first and second impressions (page 1, lines 22-104; and Figure).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2, 4-6, 24-26, 32, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lebold et al. (US 5,201,811).

Lebold et al. disclose a method and apparatus for the manufacture of complex cores, in which a vertically parted mold having two halves, each defining patterns and impressions of a volute turbo-charger housing, is used to surround a complex core defining imprint (involute) surfaces that further comprise mandrels with removable segments, the combination of which define a separate casting cavity (abstract; column 1, lines 62-68; column 2, lines 1-27 and 65-68; column 3, lines 1-68; column 4, lines 1-68; and Figures 1-7). The molten metal pouring basin cavity communicates with a sprue comprising a gate (aperture) with a J-shaped backsplash design defined in at least one of the side patterns, into which pattern(s) the involute impression is imprinted (Figures 1-7). One of ordinary skill in the art would have recognized that the vertically parted mold halves would readily be made of materials that include either metal and sand, as the use of sand molds are conventional in the art, and sand molds are durable toward molten metal contact and less expensive compared to metal molds. It has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416. The method and apparatus of Lebold et al. are advantageous for producing a complex core while reducing assembly time and labor, with improved thermal cracking resistance (column 2, lines 16-27).

5. Claims 8-12 and 15-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meloche (US 1,502,861) in view of Mohla et al. (US 5,390,723).

Meloche discloses the elements of claim 1 above. Meloche does not disclose a filter in the form of a fusible plug.

However, Mohla et al. disclose a method of treating casting metals, in which a vertically parted mold assembly containing a sprue and runner (gating) system encloses a series of molding cavities therein (abstract; column 3, lines 62-68; column 4, lines 1-16; and Figures 1-4). The sprue contains a consumable (fusible) plug assembly comprised of a steel disc-shaped member, and serving as a filter (abstract; column 1, lines 51-58; column 2, lines 28-39; column 3, lines 22-30; column 5, lines 18-44). One of ordinary skill in the art would have recognized that the shapes and sizes of the fusible plug assemblies within the gating system of Mohla et al. would readily be modified to minimize the molten metal turbulence during the pouring process. The features disclosed by Mohla et al. are advantageous for allowing non-turbulent flow of molten metal into the molding cavities while the plug assembly maintains a plugged relationship for a preselected retaining period to allow inclusions to travel to the metal surface (abstract; column 1, lines 51-58; column 2, lines 33-39; and column 4, lines 12-16).

It would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to modify the mold assembly disclosed by Meloche, by further positioning the fusible plug assembly of Mohla et al. within the gating system, in order to allow non-turbulent flow of molten metal into the molding cavities while the plug assembly maintains a plugged relationship for a preselected retaining period to allow

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inclusions to travel to the metal surface (Mohla et al.; abstract; column 1, lines 51-58; column 2, lines 33-39; and column 4, lines 12-16).

6. Claims 8-12, 15-19, 28-30, 34, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lebold et al. (US 5,201,811) in view of Mohla et al. (US 5,390,723).

Lebold et al. disclose and/or suggest the elements of claims 1 and 24 above. Lebold et al. do not disclose a filter in the form of a fusible plug.

However, Mohla et al. disclose a method of treating casting metals, in which a vertically parted mold assembly containing a sprue and runner (gating) system encloses a series of molding cavities therein (abstract; column 3, lines 62-68; column 4, lines 1-16; and Figures 1-4). The sprue contains a consumable (fusible) plug assembly comprised of a steel disc-shaped member (abstract; column 1, lines 51-58; column 2, lines 28-39; column 3, lines 22-30; column 5, lines 18-44). One of ordinary skill in the art would have recognized that the shapes and sizes of the fusible plug assemblies within the gating system of Mohla et al. would readily be modified to minimize the molten metal turbulence during the pouring process. The features disclosed by Mohla et al. are advantageous for allowing non-turbulent flow of molten metal into the molding cavities while the plug assembly maintains a plugged relationship for a preselected retaining period to allow inclusions to travel to the metal surface (abstract; column 1, lines 51-58; column 2, lines 33-39; and column 4, lines 12-16).

It would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to modify the method and apparatus for the manufacture of complex cores, as disclosed by Lebold et al., by further positioning the fusible plug assembly of Mohla et al. within the gating system, in order to allow non-turbulent flow of molten metal into the molding cavities while the plug assembly maintains a plugged relationship for a preselected retaining period to allow inclusions to travel to the metal surface (Mohla et al.; abstract; column 1, lines 51-58; column 2, lines 33-39; and column 4, lines 12-16).

7. Claims 3 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Meloche (US 1,502,861) or Lebold et al. (US 5,201,811) in view of Seidinger (US 4,913,218).

Meloche and Lebold et al. individually disclose and/or suggest the elements of claim 1 above. Neither Meloche nor Lebold et al. teaches use of a molten metal filter.

However, Seidinger discloses a feeder sprue system for a casting mold, in which a vertically parted mold contains a sprue cup for receiving molten metal, and the feeder contains a notch gate through the core and a filter (abstract; column 1, lines 5-8; column 2, lines 32-64; and Figures 1-3). The region below the filter is further provided with a J-shaped (backsplash) cavity for reducing molten metal flow turbulence (column 2, lines 56-64; and Figure 3). The advantages of the filter and (backsplash) cavity include production of high quality castings at reduced filling times (column 1, lines 43-46).

It would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to modify the mold assemblies, as disclosed individually by Meloche and Lebold et al., by adding the filter element, as taught by Seidinger, in order to produce high quality castings at reduced filling times (Seidinger; column 1, lines 43-46).

8. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over either Meloche (US 1,502,861) or Lebold et al. (US 5,201,811) in view of Seidinger (US 4,913,218), and further in view of Mohla et al. (US 5,390,723).

Meloche and Lebold et al. (individually taken in view of Seidinger) disclose and/or suggest the elements of claims 1 and 12 above. Neither Meloche, Lebold et al., nor Seidinger discloses a fusible plug.

However, Mohla et al. disclose a method of treating casting metals, in which a vertically parted mold assembly containing a sprue and runner (gating) system encloses a series of molding cavities therein (abstract; column 3, lines 62-68; column 4, lines 1-16; and Figures 1-4). The sprue contains a consumable (fusible) plug assembly comprised of a steel disc-shaped member (abstract; column 1, lines 51-58; column 2, lines 28-39; column 3, lines 22-30; column 5, lines 18-44). One of ordinary skill in the art would have recognized that the shapes and sizes of the fusible plug assemblies within the gating system of Mohla et al. would readily be modified to minimize the molten metal turbulence during the pouring process. The features disclosed by Mohla et al. are advantageous for allowing non-turbulent flow of molten metal into the molding

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cavities while the plug assembly maintains a plugged relationship for a preselected retaining period to allow inclusions to travel to the metal surface (abstract; column 1, lines 51-58; column 2, lines 33-39; and column 4, lines 12-16).

It would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to modify the mold assemblies, as disclosed individually by Meloche and Lebold et al., and adding the filter element, as taught by Seidinger, and by further positioning the fusible plug assembly of Mohla et al. within the gating system, in order to allow non-turbulent flow of molten metal into the molding cavities while the plug assembly maintains a plugged relationship for a preselected retaining period to allow inclusions to travel to the metal surface (Mohla et al.; abstract; column 1, lines 51-58; column 2, lines 33-39; and column 4, lines 12-16).

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Meloche (US 1,502,861) in view of Menningen (US 2,919,479).

Meloche discloses the elements of claim 1 above. Meloche does not teach the use of shell molds or a hollow core therein.

However, Menningen discloses a shell mold comprised of a plurality of mold elements defining multiple mold cavities and a core (column 1, lines 10-13 and 62-69; column 2, lines 29-31; column 3, lines 18-24; and Figures 1, 3, and 4). The hollow core acts as a sprue having conduits for directing molten metal from the core into the mold cavity (column 3, lines 22-24; and Figure 1). The shell mold is resin bonded (column 1,

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lines 41-45). This shell mold is advantageous for preventing detrimental flash on surfaces (column 2, lines 8-28).

It would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to modify the mold assembly disclosed by Meloche, by using the shell mold with a plurality of mold elements, as taught by Menningen, in order to prevent detrimental flash on surfaces (Menningen; column 2, lines 8-28).

10. Claims 7 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lebold et al. (US 5,201,811) in view of Menningen (US 2,919,479).

Lebold et al. disclose the elements of claims 1 and 24 above. Lebold et al. do not teach the use of shell molds or a hollow core therein.

However, Menningen discloses a shell mold comprised of a plurality of mold elements defining multiple mold cavities and a core (column 1, lines 10-13 and 62-69; column 2, lines 29-31; column 3, lines 18-24; and Figures 1, 3, and 4). The hollow core acts as a sprue having conduits for directing molten metal from the core into the mold cavity (column 3, lines 22-24; and Figure 1). The shell mold is resin bonded (column 1, lines 41-45). This shell mold is advantageous for preventing detrimental flash on surfaces (column 2, lines 8-28).

It would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to modify the vertically parted mold assembly disclosed by Lebold et al., by using the shell mold with a plurality of mold elements, as taught by

Menningen, in order to prevent detrimental flash on surfaces (Menningen; column 2, lines 8-28).

11. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over either Meloche or Lebold et al. (US 5,201,811) in view of Seidinger (US 4,913,218), and further in view of Menningen (US 2,919,479).

Meloche and Lebold et al. (individually taken in view of Seidinger) disclose the elements of claims 1 and 12 above. Neither Meloche, Lebold et al., nor Seidinger discloses the use of shell molds or a hollow core therein.

However, Menningen discloses a shell mold comprised of a plurality of mold elements defining multiple mold cavities and a core (column 1, lines 10-13 and 62-69; column 2, lines 29-31; column 3, lines 18-24; and Figures 1, 3, and 4). The hollow core acts as a sprue having conduits for directing molten metal from the core into the mold cavity (column 3, lines 22-24; and Figure 1). The shell mold is resin bonded (column 1, lines 41-45). This shell mold is advantageous for preventing detrimental flash on surfaces (column 2, lines 8-28).

It would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to modify the mold assemblies disclosed individually by Meloche and Lebold et al., and adding the filter element, as taught by Seidinger, and further by using the shell mold with a plurality of mold elements, as taught by Menningen, in order to prevent detrimental flash on surfaces (Menningen; column 2, lines 8-28).

12. Claims 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meloche (US 1,502,861) in view of Fisher et al. (US 5,033,531).

Meloche discloses the elements of claim 1 above. Meloche does not teach the adhesive, inoculant, and graphite aspects of the fusible plug assembly.

However, Fisher et al. disclose an iron casting method and mold for which a filter member in the flow cavity has a plurality of cells that contain an inoculant, such as graphite (abstract; and column 2, lines 63-66). The cells of the filter may be coated with a first layer of an adhesive and a second layer of particulate inoculant (column 3, lines 20-25 and 63-68; and column 4, lines 1-2 and 29-51). These features are advantageous for reducing casting inclusions (column 4, lines 47-49).

It would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to modify the mold assembly disclosed by Meloche, by adding the filter member with a plurality of inoculant-containing cells, as taught by Fisher et al., in order to reduce casting inclusions (Fisher et al.; column 4, lines 47-49).

13. Claims 20-22 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lebold et al. (US 5,201,811) in view of Fisher et al. (US 5,033,531).

Lebold et al. disclose or suggest the elements of claims 1 and 24 above. Lebold et al. do not teach the adhesive, inoculant, and graphite aspects of the fusible plug assembly.

However, Fisher et al. disclose an iron casting method and mold for which a filter member in the flow cavity has a plurality of cells that contain an inoculant, such as graphite (abstract; and column 2, lines 63-66). The cells of the filter may be coated with a first layer of an adhesive and a second layer of particulate inoculant (column 3, lines 20-25 and 63-68; and column 4, lines 1-2 and 29-51). These features are advantageous for reducing casting inclusions (column 4, lines 47-49).

It would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to modify the method and apparatus for the manufacture of complex cores, as disclosed by Lebold et al., by adding the filter member with a plurality of inoculant-containing cells, as taught by Fisher et al., in order to reduce casting inclusions (Fisher et al.; column 4, lines 47-49).

14. Claims 36-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lebold et al. (US 5,201,811) in view of Mohla et al. (US 5,390,723), and further in view of Fisher et al. (US 5,033,531).

Lebold et al. (in view of Mohla et al.) disclose the elements of claim 34 above. Neither Lebold et al. nor Mohla et al. discloses the adhesive, inoculant, and graphite aspects of the fusible plug assembly.

However, Fisher et al. disclose an iron casting method and mold for which a filter member in the flow cavity has a plurality of cells that contain an inoculant, such as graphite (abstract; and column 2, lines 63-66). The cells of the filter may be coated with a first layer of an adhesive and a second layer of particulate inoculant (column 3, lines

20-25 and 63-68; and column 4, lines 1-2 and 29-51). These features are advantageous for reducing casting inclusions (column 4, lines 47-49).

It would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to modify the method and apparatus for the manufacture of complex cores, as disclosed by Lebold et al., and positioning the consumable (fusible) plug assembly taught by Mohla et al., and by further adding the filter member with a plurality of inoculant-containing cells, as taught by Fisher et al., in order to reduce casting inclusions (Fisher et al.; column 4, lines 47-49).

Response to Arguments

15. The examiner acknowledges the applicant's amendment and replacement drawing sheet (Figure 7) provided with the request for continued examination, received by the USPTO on March 15, 2004. The replacement Figure 7 is approved by the examiner. A new reference has been applied in a 35 USC 102(b) rejection above (see paragraph 2), and as a primary reference in several 35 USC 103(a) rejections for a portion of the claims dependent on independent claim 1. Claims 1-38 remain under consideration in the application.

16. Applicant's arguments filed March 15, 2004, have been fully considered but they are not persuasive.

With regard to the applicant's arguments on pages 10 and 11 of the amendment, the applicant states that the mold assembly of Lebold et al. defines a J-shaped surface

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which is part of the (mold) cavity, but lacks a "separate" J-shaped pouring basin. The examiner continues to respectfully disagree, as the vertically parted mold halves (side patterns) define the pouring basin with a gate in the form of an aperture, in which the aperture is interpreted as the same structure as the gate between the pouring basin and the cavity (i.e. entrance to the cavities defining the complex core just below the mold half openings 48 and 50 of Figures 4 and 5). The casting cavity is a separate structure from the pouring basin in Lebold et al., as a casting cavity will be filled with solidifying molten metal while the pouring region is partially or totally empty, to be considered as "separate" cavities, which defines specific regions in and around the "J". Even Figure 4 of Lebold et al. (disassembled mold view) show multiple cavities, and these mold portions individually show pouring and casting mold cavities. In the next communication, the applicant is respectfully suggested to either show distinct (three-dimensional) drawings and further explanation to clarify the specific invention, or combine one or more of the dependent claims (or material from the specification) into the independent claim(s) to more clearly define the invention.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The Campbell et al. reference is cited as related art.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kevin P. Kerns whose telephone number is (571)

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272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (571) 272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin P. Kerns *Kevin Kerns 4/17/04*
Examiner
Art Unit 1725

KPK
kpk
April 17, 2004